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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,150	06/01/2006	Robert Manzke	PHDE030410US	2804

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595 MINER ROAD		
CLEVELAND, OH 44143		

EXAMINER
COCHRAN, ANTHONY K

ART UNIT	PAPER NUMBER
2882	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/596,150

Applicant(s)

MANZKE ET AL.

Examiner

Anthony Cochran

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06/01/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 June 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 06/01/2006
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Detailed Action

Foreign Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 19(a)-(d). Conditions were met with the submission of a certified copy of application EP 03104582.6 filed on 12/08/2003, which has been placed of record in the file.

Specification

The specification is objected to because the many references to the claims throughout the specification must be removed. See for example page 3 lines 14, 17, 23 and 32, and page 4 lines 14, 18, and 20. These references can create inconsistencies in the event of claim amendments and/or cancellations. Appropriate correction is required

Drawing Objections

The drawings are objected to because of the following informalities:
Figure 4, item 104 displays 1_N , it appears that this should be I_N .

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended". If a drawing

figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 1, 4, 6, and 7 are objected to because of the following informalities:

The claim(s) are narrative in form and replete with indefinite and functional or operational language. The steps which go to make up the method must be clearly and positively specified. The steps must be organized and correlated in such a manner as to present a complete operative method. A few examples of narrative language follow:

In claims 1 and 7 the present participle form of the method steps should be used. For example, "generation" should read -- generating -- and "acquisition" should read -- acquiring --, etc.

In claims 1 and 7, line 9, "the far side" lacks antecedent basis.

In claim 1, line 13, and claim 7 line 29, "with the help of" is awkward and narrative.

In claim 1, line 16, "thus enabling" is awkward and narrative.

In claim 1, line 24, "used in this case" is awkward and narrative.

In claim 4, line 2, "with the help of" is awkward and narrative.

In claim 6, line 3, "in which case" is awkward and narrative.

In claim 7, line 1, "and including" is awkward and narrative.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 8 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claim is drawn to a computer program per se. A computer program per se is abstract instructions. Therefore, a computer program is not a physical thing (product) nor a process as they are not "acts" being performed. As such, these claims are not directed to one of the statutory categories of invention (See MPEP 2106.01), but are directed to nonstatutory functional descriptive material.

It is noted that computer programs embodied on a computer readable medium or other structure, which would permit the functionality of the program to be realized, would be directed to a product and be within a statutory category of invention, so long as the

computer readable medium is not disclosed as non-statutory subject matter per se (signals or carrier waves).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 5-7 and claim 7, lines 21-31 describe relative movement between a source and object, which comprises rotation about an axis. This recitation is confusing and indefinite since the axis of rotation should be defined by the relative rotation of the source and detector.

Claim 4, lines 2-3 is indefinite insofar as the limiting meanings of "motion-artifact metric" and "motion-artifact value" are not understood.

Regarding claim 7, the phrase "in particular" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claims 2-3, 5-6, and 8 are also rejected for the above reasons by virtue of their dependency.

The Examiner has examined the claims as best understood as follows.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruder et al. (US 20050111622 A1), in view of Weese et al. (US 20050226527 A1).

With respect to claims 1 and 7, Bruder et al. discloses a CT imaging method and apparatus comprising:

a radiation source (2 and 4) for generating a bundle of rays (11) that passes through an object (P),

a drive arrangement (gantry, 6) for producing a relative movement between the radiation source on the one hand and the object on the other hand, which relative movement comprises a rotation about an axis of rotation (para 0026),

a detector unit (3 and 5),

a movement-sensing means, in particular an electrocardiograph (fig. 8 para 0027),

a reconstructing unit for reconstructing a computer tomographic image of the object from the measured values (para 0059),

a control unit (10) for controlling the radiation source, the drive arrangement, the detector unit, the movement-sensing means and the reconstructing unit in the following steps:

a) generation by the radiation source of a bundle of rays that passes through an object that moves in a periodically (para 0041 and 0042),

b) production of a relative movement between the radiation source on the one hand and the object on the other hand, which relative movement comprises rotation about an axis of rotation (para 0026),

c) acquisition, with the detector unit and during the relative movement of measured values that depend on the intensity in the bundle of rays on the far side of the object (para 0041, line 3),

d) sensing of a movement signal dependent on the movement of the object with the movement-sensing means and determination of periodically repeated phases of movement with the help of the movement signal sensed (fig. 8 and para 0042) ,

e) reconstruction of a plurality of intermediate images (SMPR, see para 0047), with measured values that were acquired while the object was in a different phase of movement (para 0059, lines 6-14),

f) determination of the phase of movement (para 0042),

g) reconstruction of a computer tomographic image with parameters different from those used for the intermediate image (para 0059),

Bruder et al. fails to disclose determining the phase of movement in which there was least movement of the object in the region, by determining the intermediate image having the fewest motion artifacts in the region.

Weese et al. teaches a motion artifact correction process for CT images wherein the images which represent the object in a state of motion with as few motion artifacts as possible are used in the reconstruction (para 0006 and para 0017).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method and apparatus of Bruder et al. to use the images with as few motion artifacts as possible in the reconstruction, as suggested by Weese et al., since a person would have been motivated to enhance the information content of images of moving objects as stated by Weese et al. (abstract).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bruder et al. and Weese et al. as applied to claim 1 above, and further in view of Cahill (US 20040062342 A1).

With respect to claim 2, Bruder et al. and Weese et al. disclose the method of claim 1.

Bruder et al. and Weese et al. fail to disclose wherein the intermediate images in are reconstructed with a lower spatial resolution than the computer tomographic image to be reconstructed.

Cahill discloses an intermediate step of performing a low-resolution reconstruction, by initially performing 3D reconstruction on projection images that have been sampled at a lower resolution, and then using the acquired data associated with a particular region of interest to reconstruct a high-resolution image of the region of interest (para 0007).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the method of Bruder et al. and Weese et al. to include reconstructing lower resolution images as suggested by Cahill, since a person would have been motivated to reduce the amount of computations necessary in the intermediate step as stated by Cahill (para 0007).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bruder et al. and Weese et al. as applied to claim 1 above, and further in view of Cesmeli et al. (US 20040125908 A1).

With respect to claim 3, Bruder et al. and Weese et al. disclose the method of claim 1.

Bruder et al. and Weese et al. fail to disclose wherein the region of the object that is to be analyzed is divided into a plurality of subregions and in that steps e) to g) are performed for each sub-region.

Cesmeli et al. discloses limiting analysis to a subregion of the field of view associated with the volume of interest, such as the heart, in a temporally resolved reconstruction (para 0064).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Bruder et al. and Weese et al. to limit analysis to a subregion as suggested by Cesmeli et al., since a person would have been motivated increase the fidelity of the desired motion signal relative to the corrupted portion as stated by Cesmeli et al. (para 0064, lines 5-8).

Allowable Subject Matter

Claim 4 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter.

Regarding claim 4 the prior art does not disclose or fairly suggest determining a motion artifact value for individual images having the lowest motion artifact value in combination with all the limitations in each respective claim and respective base claim.

Claims 5 and 6 would be allowable by virtue of their dependency.

Conclusion

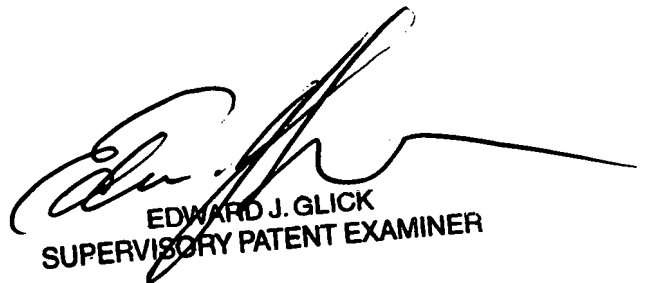
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Cochran whose telephone number is (571) 272-9794. The examiner can normally be reached on Monday - Friday from 8:00am to 5:00pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick, can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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